

What is claimed is:

1. An ethylene-based copolymer [I]  
5 characterized by:
  - (a-1) having temperature ( $T_m$ ) at the maximum peak in the endothermic curve, measured by a differential scanning calorimeter (DSC), of 40 to 90°C,
  - (a-2) containing the component soluble in decane  
10 at normal temperature at 1 to 70% by weight, and
  - (a-3) containing the component soluble in decane at normal temperature which comprises (i) a recurring unit derived from ethylene and (ii) a recurring unit derived from an  $\alpha$ -olefin of 4 or more carbon atoms, and  
15 in which a content of (i) the recurring unit derived from ethylene is 50 to 75% by mole.
2. An ethylene-based copolymer composition [II] characterized by containing the ethylene-based  
20 copolymer which satisfies the following conditions (b-1) to (b-3):
  - (b-1) having temperature ( $T_m$ ) at the maximum peak in the endothermic curve of the component soluble in decane at 64°C, measured by a differential scanning

calorimeter (DSC), of 40 to 90°C,

(b-2) containing the component soluble in decane at 64°C which contains the component soluble in decane at normal temperature at 1 to 70% by weight, and

5 (b-3) containing the component soluble in decane at normal temperature which comprises (i) a recurring unit derived from ethylene and (ii) a recurring unit derived from an  $\alpha$ -olefin of 4 or more carbon atoms, and in which a content of (i) the recurring unit derived  
10 from ethylene is 50 to 75% by mole.

3. A propylene-based copolymer composition [III] characterized by containing the propylene-based copolymer and satisfying the following conditions (c-1)  
15 to (c-3):

(c-1) containing the component soluble in decane at 64°C at 1 to 99% by weight which has a temperature ( $T_m$ ) at the maximum peak in the endothermic curve, measured by a differential scanning calorimeter (DSC),  
20 of 40 to 90°C,

(c-2) containing the component soluble in decane at 64°C which contains the component soluble in decane at normal temperature at 1 to 70% by weight, and

(c-3) containing the component soluble in decane

at normal temperature which comprises (i) a recurring unit derived from ethylene and (ii) a recurring unit derived from an  $\alpha$ -olefin of 4 or more carbon atoms, and in which a content of (i) the recurring unit derived from ethylene is 50 to 75% by mole.

4. An ethylene/ $\alpha$ -olefin copolymer composition comprising:  
1 to 70% by weight of [A] a copolymer of ethylene and  $\alpha$ -olefin of 4 to 20 carbon atoms which comprises (A-i) 50 to 70% by mole of (a) a recurring unit derived from ethylene and 30 to 50% by mole of (b) a recurring unit derived from an  $\alpha$ -olefin of 4 to 20 carbon atoms, and 30 to 99% by weight of [B] an at least one of ethylene-based copolymer comprising (a) ethylene, (b) at least one selected from  $\alpha$ -olefin of 4 to 20 carbon atoms and cyclic olefin-based compound, and having (B-i) a density of 0.870 to 0.895g/cm<sup>3</sup>.

5. The ethylene/ $\alpha$ -olefin copolymer composition according to Claim 4 which has a melt flow rate (MFR at 190°C and a load of 2.16kg) of 0.01 to 50g/10 minutes.

6. The ethylene/ $\alpha$ -olefin copolymer composition

according to Claim 4 or 5, wherein ratio of density ( $d_b$ ) of said ethylene-based copolymer [B] to density ( $d_a$ ) of said ethylene/ $\alpha$ -olefin copolymer [A] ( $d_b/d_a$ ) is 1.05 or less.

5

7. The ethylene/ $\alpha$ -olefin copolymer composition according to one of Claims 4 to 6 which has (A-ii) a glass transition temperature of  $-60^\circ\text{C}$  or lower, determined by a differential scanning calorimeter (DSC) and crystallinity of 1% or less

10

8. The ethylene/ $\alpha$ -olefin copolymer composition according to one of Claims 4 to 7 which has (A-iii) a B value of 0.9 to 1.5, given by the following general formula (1):

15

$$B \text{ value} = [P_{0E}] / (2[P_E][P_0]) \quad (1)$$

wherein,  $[P_E]$  is molar fraction of the ethylene-derived recurring unit in the copolymer,  $[P_0]$  is molar fraction of the  $\alpha$ -olefin-derived recurring unit in the copolymer, and  $[P_{0E}]$  is a number ratio of the ethylene/ $\alpha$ -olefin copolymer chains to the total dyad chains in the copolymer, determined by the  $^{13}\text{C}$ -NMR spectroscopy.

20

9. The ethylene/ $\alpha$ -olefin copolymer composition

according to one of Claims 4 to 8 which has (A-iv) an intrinsic viscosity  $[\eta]$  of 0.1 to 10.0dl/g, determined in decalin at 135°C.

5           10.    The ethylene/ $\alpha$ -olefin copolymer composition according to one of Claims 4 to 9, wherein said ethylene-based copolymer [B] has a melt flow rate (190°C and a load of 2.16kg) of 0.1 to 50g/10 minutes.

10           11.    The ethylene/ $\alpha$ -olefin copolymer composition according to one of Claims 4 to 10, wherein said ethylene-based copolymer [B] has (B-iii) a temperature ( $T_m$ ) at the maximum peak in the endothermic curve, measured by a differential scanning calorimeter (DSC),  
15 correlated with density (d) by the following relationship:

$$T_m < 400 \times d - 250$$

12.    A resin modifier composed of the  
20 ethylene/ $\alpha$ -olefin copolymer composition according to one of Claims 4 to 11.

13.    A method for modifying resin characterized by blending the pellets of the ethylene/ $\alpha$ -olefin

copolymer composition according to one of Claims 4 to 11 and resin to be modified in the molten state.

14. A propylene-based polymer composition
- 5 comprised of the propylene-based polymer [C-1], ethylene/ $\alpha$ -olefin copolymer [A] and ethylene-based copolymer [B], and characterized by:
- (i) containing said propylene-based polymer [C-1] at 99 to 1% by weight, and ethylene/ $\alpha$ -olefin copolymer [A]
- 10 and ethylene-based copolymer [B] at 1 to 99% by weight (total content of [A] and [B]), and
- (ii) having a content ratio of the ethylene/ $\alpha$ -olefin copolymer [A] to the ethylene-based copolymer [B], i.e., [A]/[B] content ratio, is 1/99 to 70/30.

15

15. The propylene-based polymer composition according to Claim 14, wherein said propylene-based polymer [C-1] is contained at 98 to 60% by weight, and said ethylene/ $\alpha$ -olefin copolymer [A] and ethylene-based
- 20 copolymer [B] at 2 to 40% by weight (total content of [A] and [B]).

16. The propylene-based polymer composition according to Claim 14 or 15, wherein said propylene-

based polymer [C-1] has a melt flow rate (230°C and a load of 2.16kg) of 0.01g/10 minutes or more.

17. The propylene-based polymer composition according to one of Claims 14 to 16 which has a damping factor peak caused from the glass transition temperature of said propylene-based polymer [C-1] and that caused from the glass transition temperature of said ethylene/ $\alpha$ -olefin copolymer composition [AB] (composed of said ethylene/ $\alpha$ -olefin copolymer [A] and ethylene-based copolymer [B]), when the temperature-dependence of the modulus of elasticity is measured, wherein these peaks are separated from each other.

18. A propylene-based copolymer composition comprised of 20 to 93% by weight of [C-2], 6 to 79% by weight of [AB] and 1 to 25% by weight of [D], wherein: [C-2]: a propylene-based polymer:

(1) having a melt flow rate (MFR, at 230°C and a load of 2.16kg) of 0.1 to 400g/10 minutes, determined in accordance with ASTM D-1238,

(2) containing 0.01 to 30% by weight of the component soluble in decane at normal temperature, and an intrinsic viscosity  $[\eta]$  of 0.2 to 10dl/g, determined

in decalin at 135°C, and

(3) having a pentad isotacticity ( $I_5$ ) of 0.95 or more, determined by the  $^{13}\text{C}$ -NMR spectroscopy for the component insoluble in decane at normal temperature;

5 [AB]: a composition composed of:

[A-1]: a copolymer of ethylene and  $\alpha$ -olefin of 4 to 20 carbon atoms,

(i) comprising 50 to 70% by mole of (a) a recurring unit derived from the ethylene and 30 to 50%  
10 by mole of (b) a recurring unit derived from the  $\alpha$ -olefin of 4 to 20 carbon atoms, and

(ii) having an intrinsic viscosity  $[\eta]$  of 0.1 to 10.0dl/g, determined in decalin at 135°C, and

[B-1]: a copolymer of (a) ethylene and (b) at  
15 least one compound selected from the group consisting of  $\alpha$ -olefins and cyclo-olefins of 3 to 20 carbon atoms, having

(i) a density of 0.870 to 0.895g/cm<sup>3</sup> and

(ii) a melt flow rate (190°C and a load of  
20 2.16kg) of 0.1 to 50g/10 minutes,

wherein the copolymers [A-1] and [B-1] are incorporated at 1 to 50% and 50 to 99% by weight, respectively, based on the whole composition [AB], and  
[D]: an inorganic filler.



19. The propylene-based copolymer composition according to Claim 18, wherein ratio of density ( $d_2$ ) of said ethylene-based copolymer [B-1] to density ( $d_1$ ) of said ethylene/ $\alpha$ -olefin copolymer [A-1] ( $d_2/d_1$ ) is 1.05 or less.

20. The propylene-based copolymer composition according to Claim 18 or 19 which has a damping factor peak caused from the glass transition temperature of said propylene-based polymer [C-2] and that caused from the glass transition temperature of said ethylene/ $\alpha$ -olefin copolymer composition [AB], when the temperature-dependence of the modulus of elasticity is measured, wherein these peaks are separated from each other.

21. A formed article of the propylene-based copolymer composition according to one of Claims 18 to 20.

22. The formed article according to Claim 21 which is a sheet or injection-molded article.

23. The formed article according to Claim 21 which is an automobile interior or exterior member, or electric appliance case.

5        24. A propylene-based copolymer composition composed of 20 to 95% by weight of [C-3] and 5 to 80% by weight of [AB-1], wherein:

[C-3]: a propylene/ $\alpha$ -olefin copolymer:

(1) having an intrinsic viscosity  $[\eta]$  of 0.01 to  
10 10dl/g, determined in decalin at 135°C, and

(2) comprising propylene and 1.5 to 10% by mole of an  $\alpha$ -olefin, other than propylene, of 2 to 20 carbon atoms, and

[AB-1]: an ethylene/ $\alpha$ -olefin copolymer composition,  
15 composed of:

[A-1]: an ethylene/ $\alpha$ -olefin copolymer of ethylene and  $\alpha$ -olefin of 4 to 20 carbon atoms,

(i) comprising 50 to 70% by mole of (a) a recurring unit derived from the ethylene and 30 to 50% by mole  
20 of (b) a recurring unit derived from the  $\alpha$ -olefin of 4 to 20 carbon atoms, and

(ii) having an intrinsic viscosity  $[\eta]$  of 0.1 to 10.0dl/g, determined in decalin at 135°C, and

[B-1]: an ethylene-based copolymer of (a)

ethylene and (b) at least one compound selected from the group consisting of  $\alpha$ -olefins and cyclo-olefins of 3 to 20 carbon atoms, having

- (i) a density of 0.870 to 0.895g/cm<sup>3</sup> and
- 5 (ii) a melt flow rate (190°C and a load of 2.16kg) of 0.1 to 50g/10 minutes,

wherein the copolymers [A-1] and [B-1] are blended at 1 to 50% and 50 to 99% by weight, respectively, based on the whole composition.

10

25. The propylene-based copolymer composition according to Claim 24, wherein ratio of density ( $d_2$ ) of said ethylene-based copolymer [B-1] to density ( $d_1$ ) of said ethylene/ $\alpha$ -olefin copolymer [A-1] ( $d_2/d_1$ ) is 1.05  
15 or less.

26. The propylene-based copolymer composition according to Claim 24 or 25 which has a damping factor peak caused from the glass transition temperature of  
20 said propylene/ $\alpha$ -olefin copolymer [C-3] and that caused from the glass transition temperature of said ethylene/ $\alpha$ -olefin copolymer composition [AB], when the temperature-dependence of the modulus of elasticity is measured, wherein these peaks are separated from each

other.

27. The propylene-based copolymer composition according to one of Claims 24 to 26, wherein said  
5 propylene/ $\alpha$ -olefin copolymer composition [C-3] has a microisotacticity of 0.8 or more, with respect to the triad chains of propylene.

28. The propylene-based copolymer composition  
10 according to one of Claims 24 to 27, wherein said propylene/ $\alpha$ -olefin copolymer [C-3] has a molecular weight distribution (Mw/Mn) of 6 or less, determined by GPC.

15 29. The propylene-based copolymer composition according to one of Claims 24 to 28, wherein said propylene/ $\alpha$ -olefin copolymer [C-3] has a glass transition temperature  $T_g$  of  $-10^\circ\text{C}$  or lower.

20 30. A formed article composed of the propylene/ $\alpha$ -olefin copolymer composition according to one of Claims 24 to 29.

31. The formed article according to Claim 30

which is in the form of sheet or film.

32. The formed article according to Claim 30  
which is in the form of filaments.

5

33. The formed article according to Claim 30  
which is in the form of medical container or tube.

34. The formed article according to Claim 30  
10 which is in the form of transfusion container or tube.

11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25